

REMARKS

Applicants submit this Amendment in reply to the Final Office Action mailed April 18, 2008. Claims 24-48 remain pending in this application, of which claims 24, 34, 46, 47, and 48 are independent.

In the Office Action, the Examiner rejected claims 46 and 47 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,628,869 ("Bohnert"); and rejected claims 24-27, 29, 30, 32-36, 38, 39, and 41-45 under 35 U.S.C. § 103(a) as being anticipated by U.S. Patent No. 5,704,960 ("Evans").

In this Amendment, Applicants have amended independent claim 46 to recite, among other things:

providing at least a first span of optical fiber . . . ; providing at least a second span of optical fiber . . . ; and joining the first span and the second span together at a respective end thereof, such that the first and the second span of optical fiber exhibit mutually opposite helicity.

Independent claim 47 has been amended to recite similar features. Support for these amendments can be found at page 9, lines 13-21.

Applicants respectfully traverse all pending rejections for at least the reasons discussed below.

Rejections Under 35 U.S.C. § 102(b)

Applicants respectfully traverse the rejection of claims 46 and 47 under 35 U.S.C. § 102(b) as being anticipated by Bohnert. In order to properly establish that Bohnert anticipates Applicants' claimed invention under 35 U.S.C. § 102, every element of the claims in issue must be found, either expressly or described under principles of inherency, in that single reference. Furthermore, "[t]he identical invention must be

shown in as complete detail as is contained in the... claim.” See M.P.E.P. § 2131, quoting *Richardson v. Suzuki Motor Co.*, 868 F.2d 1126, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

Bohnert does not disclose every element of Applicants’ claimed invention. Independent claim 46 recites, in part, “providing at least a first span of optical fiber obtained from at least one first unidirectionally-spun optical fiber unidirectionally-spun in a first direction; . . . a second span of optical fiber obtained from at least one second unidirectionally-spun optical fiber unidirectionally-spun in a second direction opposite to the first direction; and joining the first span and the second span together . . . such that the first and the second span of optical fiber exhibit mutually opposite helicity.”

Independent claim 47 recites similar features. Bohnert fails to disclose a cable comprising optical fiber spans which are joined so as to “exhibit mutually opposite helicity.” Rather, Bohnert describes a process whereby two fibers are first joined to one another by means of an electric arc so as to produce a joint therebetween and then twisted so as to exhibit the same helicity. The reference states, at column 3, line 13:

The two fibers 1, 2 are joined to one another by means of the splicer in an electric arc so as to produce joint 3. . . . The result is a fiber assembly which has a section 4 clamped between two holders 5, 6, the section 4 including the joint 3. . . . At least one of the two holders 5, 6 is designed as a rotary holder with the aid of which the clamped section 4 can be rotated about an optical axis or the longitudinal axis of the fiber assembly. . . . The section 4 [comprising both fiber 1 and 2] or the fiber assembly is now twisted by at least approximately a pre-defined angle α

Nowhere does it appear that Bohnert discloses joining two optical fibers, one spun “in a first direction” and the second spun “in a second direction opposite to the first direction” such that the joined fibers “exhibit mutually opposite helicity.”

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 46 and 47 based upon Bohnert under 35 U.S.C. § 102(b) and indicate their allowability.

Rejections Under 35 U.S.C. § 103(a)

The Examiner rejected claims 24-27, 29, 30, 32-36, 38, 39, and 41-45 under 35 U.S.C. § 103(a) as being unpatentable over Evans. To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See M.P.E.P. § 2142, 8th Ed., Rev. 5 (August 2006). Moreover, “in formulating a rejection under 35 U.S.C. § 103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed.” USPTO Memorandum from Margaret A. Focarino, Deputy Commissioner for Patent Operations, May 3, 2007, page 2.

A *prima facie* case of obviousness has not been established because, among other things, Evans does not appear to teach or suggest every feature of independent claim 24. Namely, the reference fails to teach or suggest “at least one first unidirectionally-spun optical fiber span and at least one second unidirectionally-spun optical fiber span having mutually opposite spinning directions, wherein the at least one first unidirectionally-spun optical fiber span is obtained from at least one first unidirectionally-spun optical fiber, the at least second unidirectionally-spun optical fiber span is obtained from at least one second unidirectionally-spun optical fiber, the first and second unidirectionally-spun optical fibers being distinct optical fibers and having mutually opposite helicity.” Independent claim 34 recites similar features.

In the Office Action, the Examiner concedes that Evans does not disclose “two fibers each spun unidirectionally to be joined together,” (Office Action at 2) but asserts that Applicants’ invention, as claimed, is still obvious in light of the reference because there is no structural difference between the end product of the process described by Applicants and that described in Evans. Further, the Examiner asserts, “Applicant has not presented any arguments or remarks that creating an optical link with two separate fibers holds any advantage over pre-existing art.” Office Action at 3-4. Applicants disagree. Evans describes a process whereby a single fiber is spun in alternately opposite directions, described in Applicants’ specification as the “alternate spinning technique.” Indeed, in Evans, the fiber “has alternating lengths of spins or twists which have been formed by applying torque alternately in the clockwise and then in the counterclockwise direction or viceversa.” Col. 4, ll. 36-39. As an unavoidable consequence of this alternate-spinning technique, the fiber of Evans exhibits, along its length, sites which correspond to a zero spin rate: when, as in Evans, the torque has to be applied first clockwise, and then counterclockwise (or viceversa), the spin rate necessarily has to decrease to zero for a period. These fiber sites are referred to by Evans as “reversal length L”, which is the length in meters between spins in the opposite directions. Col. 4, ll. 40-42. Having fiber sites of zero spin rate is detrimental for the PMD of the fiber because there is an increase in the effective birefringence seen by the pulse and, thus, a higher contribution for PMD.

Applicants’ specification goes into some detail outlining both the procedural and structural advantages of an optical fiber link according to the claimed invention, using at least two unidirectionally-spun fibers that can be spliced together, as opposed to an

optical fiber formed according to an alternate spinning technique. One such advantage is eliminating sites that correspond to a zero spin rate. This is achieved by joining different fiber spans of different unidirectionally-spun fibers such that they exhibit mutually opposite helicity. Applicants' specification, after setting forth some potentially undesirable qualities of an optical fiber comprised of only a single fiber unidirectionally spun, states:

The Applicant has found some other drawbacks of the alternate spinning technique, not previously highlighted. Alternate spinning may for example cause a relatively low mechanical efficiency of the spinning device, due to the continuous accelerations and decelerations. Moreover, with respect to a unidirectional spin, an alternate spin requires a relatively high peak profile amplitude to compensate those positions of the profile where the rotation slows down to change direction and, therefore, to guarantee a sufficient average spin rate. Besides all this, the sites where the spin rate is zero are detrimental for the PMD [a type of pulse spreading caused by birefringence in a fiber], because there is an increase of the effective birefringence seen by the pulse, and so a higher contribution for PMD.

Specification at 5-6. The specification then sets forth, as one object of the present invention, Applicants' intention to devise an optical fiber link, and process for making the same, that incorporates some of the best qualities of both unidirectionally spun fibers and alternately spun fibers, while attempting to minimize the deficiencies inherent in each:

With these objects in mind, the Applicant has found that the increase in PMD_c exhibited by unidirectionally spun fibers can be completely eliminated or substantially reduced if an optical fiber link is made of unidirectionally spun fiber spans, of appropriate lengths, with opposite helicity, spliced one to the other to form the optical fiber.

Specification at 9. Thus, the Examiner's assertion that the claimed invention is functionally and structurally equivalent to the optical fiber disclosed in Evans is unfounded.

Accordingly, Applicants respectfully request the Examiner reconsider and withdraw the rejection of independent claims 24 and 34 based upon Evans under 35 U.S.C. § 103(a). Moreover, claims 25-27, 29, 30, 32, 33, 35, 36, 38, 39, and 41-45 depend from claims 24 and 34, respectively, and, thus, contain all the elements and limitations thereof. As a result, dependent claims 25-27, 29, 30, 32, 33, 35, 36, 38, 39, and 41-45 are allowable at least due to their corresponding dependence from independent claims 24 and 34.

Claim Scope

It is to be understood that Applicants are in no way intending to limit the scope of the claims to any exemplary embodiments described in the specification or abstract and or shown in the drawings. Rather, Applicants believe that they are entitled to have the claims interpreted broadly, to the maximum extent permitted by statute, regulation, and applicable case law.

Conclusion

Applicants respectfully request that this Amendment under 37 C.F.R. § 1.116 be entered by the Examiner, placing claims 24-48 in condition for allowance. Applicants submit that the proposed amendments of claims 46 and 47 do not raise new issues or necessitate the undertaking of any additional search of the art by the Examiner, since all of the elements and their relationships claimed were recited in other claims already examined. Therefore, this Amendment should allow for immediate action by the Examiner.

Furthermore, Applicants respectfully point out that the Final Action by the Examiner presented some new arguments as to the application of the art against Applicants' invention. It is respectfully submitted that the entering of the Amendment would allow the Applicant to reply to the final rejections and place the application in condition for allowance.

Finally, Applicants submit that the entry of the amendment would place the application in better form for appeal, should the Examiner dispute the patentability of the pending claims.

In view of the foregoing remarks, Applicants submit that this claimed invention, as amended, is neither anticipated nor rendered obvious in view of the prior art references cited against this application. Applicants therefore request the entry of this Amendment, the Examiner's reconsideration and reexamination of the application, and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

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By: 

Benjamin D. Bailey
Reg. No. 60,539